CLAIMS

1) A device allowing to separate at least one compound from a mixture or a body by adsorption with a simulated moving bed, comprising at least :

- an enclosure or column comprising one or more adsorbent beds (Ai), two adsorbent beds being separated by at least one fluid distribution and extraction plate (Pi), the plate comprising one or more panels allowing distribution, mixing and/or extraction of the fluids,
- at least one line (4) intended for delivery of a main fluid and a line (2) intended for extraction of the main fluid,
- several lines (10, 11, 12, 13, Ti) allowing extraction or injection of secondary fluids,
- a bypass circuit communicating a distribution plate with at least one bypass line (Li,j),
- the panel comprises a single distribution, mixing and/or extraction chamber (Ci),

characterized in that :

- the device comprises means (14, Voi,j, 20) for communicating at least one chamber (Ci) with at least one bypass line (Li,j),
- at least one end of a bypass line communicates with a zone (Ri, R'i) of an adsorbent bed, said zone being distinct from a distribution chamber (Ci), and another end is connected to said chamber (Ci).

2) A device as claimed in claim 1, characterized in that said communication means comprise at least one valve Voi,j arranged on at least one bypass line (Li,j) and in that the end of the bypass line that is not connected to the zone of the adsorbent bed is connected to a delivery and/or extraction line (Ti).

3) A device as claimed in claim 1, characterized in that said communication means comprise at least one rotary valve (20), said rotary valve being connected to at least one delivery and/or extraction line (Ti) and to at least one bypass line (Li,j), said valve comprising means allowing at least to communicate a delivery and/or extraction line with at least one bypass line.

4) A device as claimed in claim 3, characterized in that said rotary valve (20) allows to communicate several groups of lines, group G_1, group G_2 and group G_3, said valve comprising :

- a stator (110) provided with several means (E, F, R, S) intended for circulation of the fluid(s) of group G_1, means (115, 116) allowing passage of at least two fluids F_1, F_2 belonging to group G_3,
- a rotor (117) equipped with means (119) allowing passage of the fluids of group G_3 and means (120) allowing communication of either the fluids of group G_1 with group G_3, or of group G_3 with group G_3,
- the number of means (115) intended for passage of fluid F_1 is substantially equal to the number of means (116) intended for passage of fluid F_2, said valve comprises means (122) for communicating at least two fluids of group G_3 and flow section S_1 of the ports intended for fluid F_1 is different from flow section S_2 of the ports intended for fluid F_2.

5) A device as claimed in claim 4, characterized in that the means provided on the valve for passage of fluid F_1 and of fluid F_2 have flow surface areas S_1 and S_2 respectively and in that the S_1/S_2 ratio is about 4 and preferably ranges between 2 and 10.

6) A device as claimed in ~~any one of claims 4 or 5,~~ claim 1 characterized in that said means allowing communication of the fluids of group G_3 consist of slots (122) provided in a layer of material or liner deposited on the lower face of the rotor.

7) A device as claimed in claim 6, characterized in that a slot (122) has a depth « Pe » and said depth is at least equal to the thickness « e » of the liner.

8) A device as claimed in ~~any one of claims 6 or 7,~~ claim 1 characterized in that said circulation means (E, R, S, F) consist of several grooves arranged on the resting face or upper face of the stator and in that slots (122) are provided in the liner.

9) A device as claimed in ~~any one of claims 4 to 8,~~ claim 1 characterized in that circulation means (E, R, S, F) are 4 in number.

10) A device as claimed in claim 1, characterized in that said enclosure comprises a non-perforated central tube over at least part of the length thereof, and in that the panels forming a plate exhibit a tangential type cutout, zone (Ri, R'i) comprises at least one diverted fluid distribution means (53, 54), the end of bypass line (Li,j) opens into said distribution means (53, 54).

11) A device as claimed in claim 10, characterized in that the fluid distribution circuit is arranged around said enclosure and in that it comprises a main line (61)

divided into several secondary lines (62, 63, 62a, 62b, ...) so that the fluid(s) reach the panels forming a plate substantially at the same time.

12) A device as claimed in claim 1, characterized in that the plates exhibit a parallel type cutout and in that the fluid distribution device comprises a main line, the bypass line is connected to an adsorbent bed by means of a device comprising transfer ports, said device being mounted on the fluid distribution spider.

13) A device as claimed in claim 1, characterized in that a plate is delimited by a lower grid (6) and an upper grid (7) and in that the end of the bypass line connected to the adsorbent bed is connected to a distribution means (30) arranged above said upper grid.

14) A device as claimed in claim 1, characterized in that a plate consists of several panels exhibiting a radial type cutout, the enclosure comprises a central tube and a secondary fluid distribution ring associated with a distribution plate, diverted fluid distribution means, said means being arranged below the distribution ring and said means being connected to the end of the bypass line, itself connected to a zone of an adsorbent bed.

15) A device as claimed in claim 14, characterized in that said means comprise at least one diverted fluid distribution ring (53), said ring (53) being arranged in a perforated means (55), said means having a substantially conical shape.

16) A device as claimed in claim 10, characterized in that said perforated means comprises a wall (55) forming an angle α with the central tube and in that said ring (53) is located at a distance a from said grid.

17) A device as claimed in ~~any one of the previous claims~~ claim 1, characterized in that said column comprises a substantially central mast comprising one or more mast elements (80), including at least :

- an upper part (81),
- a distributor-collector part (82) comprising one or more secondary ports (86i) and at least one main port (85), the flow sections of ports (85) and (86i) being different,
- a lower part (83),
- distributor-collector part(s) (82) are arranged between an upper part (81) and a lower part (83),
- a sealing element (84a) arranged between distributor-collector part (82) and lower part (83),
- a separation element (87) arranged on distributor-collector part (82), thus delimiting two fluid circulation spaces (82a, 82b).

18) A process intended for injection of a diverted fluid in a simulated moving bed separation process, comprising at least the following stages :

- circulating a main fluid through several adsorbent beds,
- injecting and extracting secondary fluids (feed, desorbent, ...) according to a suitable sequence in order to achieve separation of the constituents of the feed,
- injecting a diverted fluid,

characterized in that at least part of the main fluid is circulated outside the enclosure allowing separation by means of a bypass line comprising at least two ends, one end

being connected to a zone of an adsorbent bed distinct from a chamber (Ci) so as to inject and/or to extract part of the main fluid in the zone.

19) A process as claimed in claim 18, characterized in that a fraction of the main fluid is drawn off from a chamber (Ci) corresponding to a plate Pi and the main fluid fraction drawn off is injected into a zone of adsorbent bed Ai+1.

20) A process as claimed in claim 18, characterized in that a fraction of the main fluid is drawn off from a zone of an adsorbent bed Ai and said fraction is injected into chamber Ci.

21) Application of the device as claimed in ~~any one of claims 1 to 17 and of the process as claimed in any one of claims 18 to 20~~ claim 1 for separation of paraxylene from aromatic hydrocarbon-containing feeds with eight carbon atoms.